

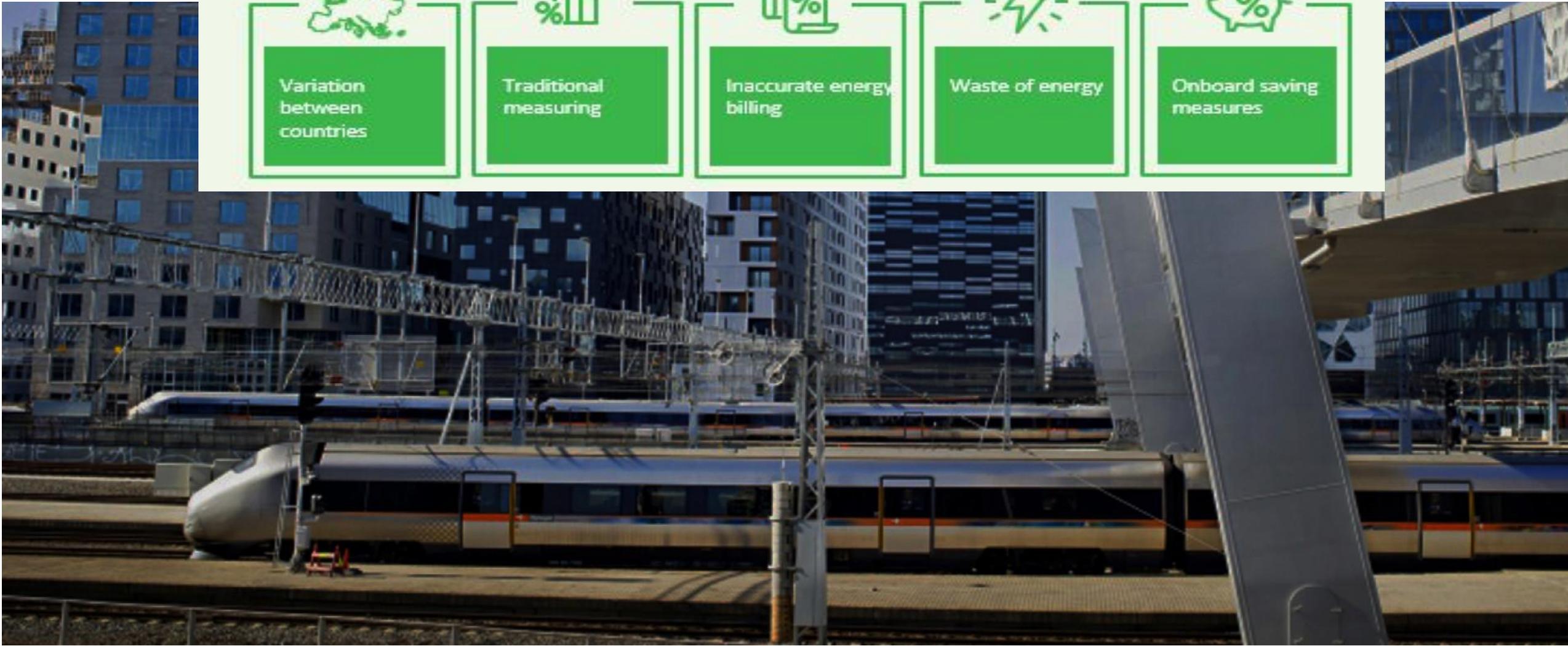
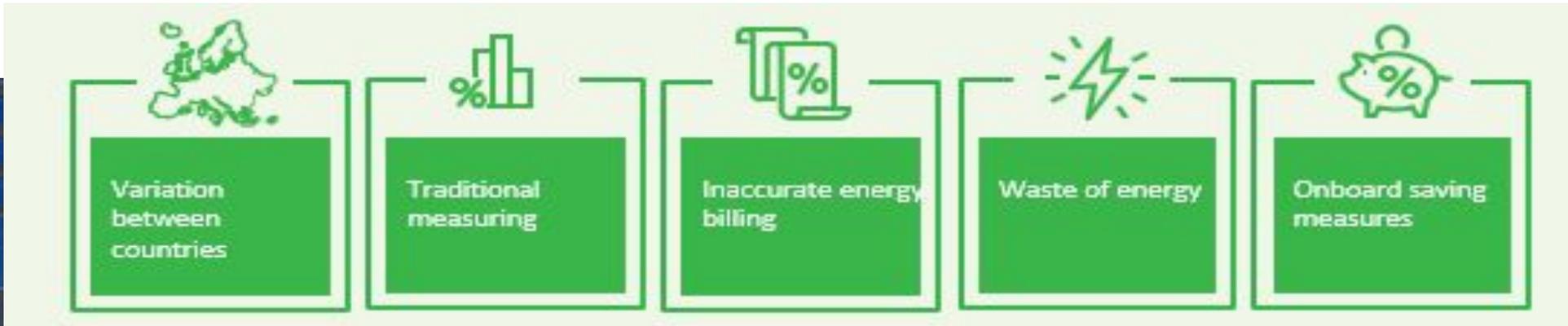


Incentivising sustainable behavior:

The Eress solution
and how operators reduce
energy usage and cost



Today's Situation – Railway Trends



Eress solution



Who is Eress?

- ✓ An open partnership for railway infrastructure managers in Europe
- ✓ Established 2007, originating from UIC workgroup initiative and have grown ever since
- ✓ Presently includes the railway infrastructure managers in 10 countries (Norway, Sweden, Denmark, Finland, Netherlands, Belgium, Luxembourg, Switzerland, Spain and Portugal).
- ✓ Additional IMs is cooperating on operations with Eress (DB, SNCF/RTE, ÖBB)
- ✓ A non-profit organization jointly owned by the 10 IMs

The majority of active IMs in Europe

What does Eress do?

- ☑ Incentify and facilitate energy savings: lower energy use = lower energy bill
- ☑ Provide environmental savings: lower energy use = environmental savings
- ☑ Economy of scale: shared systems = lower cost
- ☑ Cooperate: Involve all relevant parties (IMs, RUs, VKs, suppliers, regulators, etc.
- ☑ Info sharing: know-how, problem solving, solutions, best-practices

Economy of scale and power of sharing

How?

- ☑ Eress took a Tesla approach
- ☑ Develop and operate interoperable traction energy settlement system that can use energy metering data from trains
- ☑ Common/shared systems and services
- ☑ Develop supplier market of necessary products and services
- ☑ Promote common traction energy metering and settlement standards, agreements and regulation in Europe
- ☑ Running market forums, hot-topic workshops & webinars and meetings

Entrepreneurship

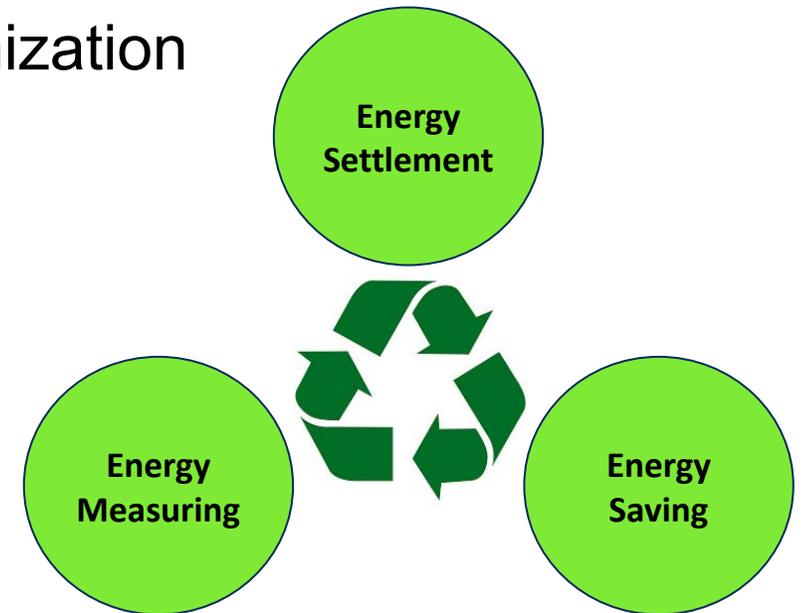
*“You can't manage what
you don't measure”*

JAN VETLE MOEN, ENERGY ADVISOR NSB AS
AT THE UIC WORLD ENERGY EFFICIENCY CONFERENCE
PORTOROŽ SLOVENIA

Many benefits of Energy metering on Trains

- Metering for energy billing, saving energy = saving money
- Metering for onboard energy efficiency programs
- Metering for onground energy efficiency analysis
- Metering for electricity grid surveillance and maintenance
- Metering for electricity grid operational optimization

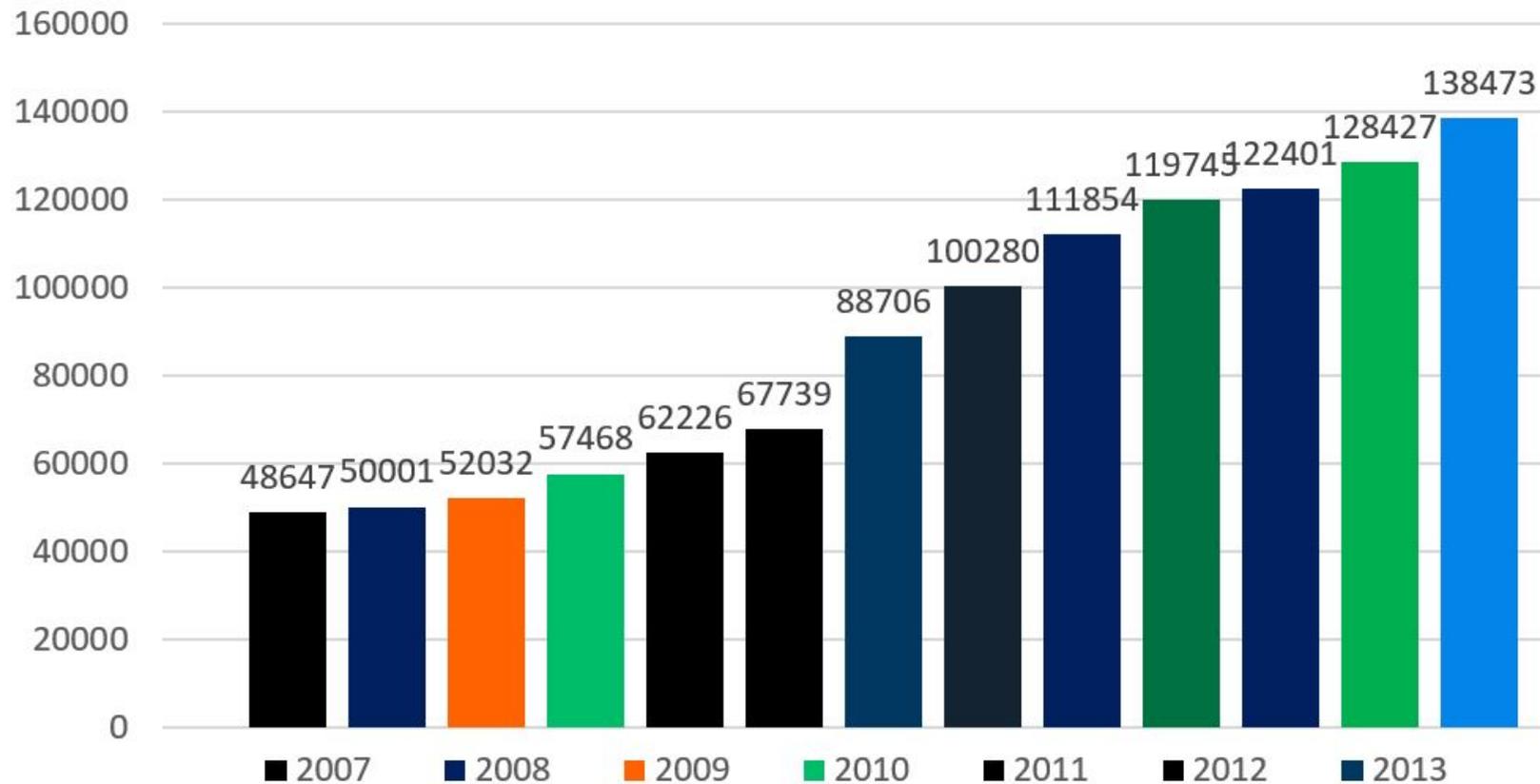
Scope is to incentify energy saving
by using energy metering
in billing of energy consumption



“The most environmentally friendly and cheapest energy....
is the energy you saved, regenerated or did not have to use to
get the job done”.



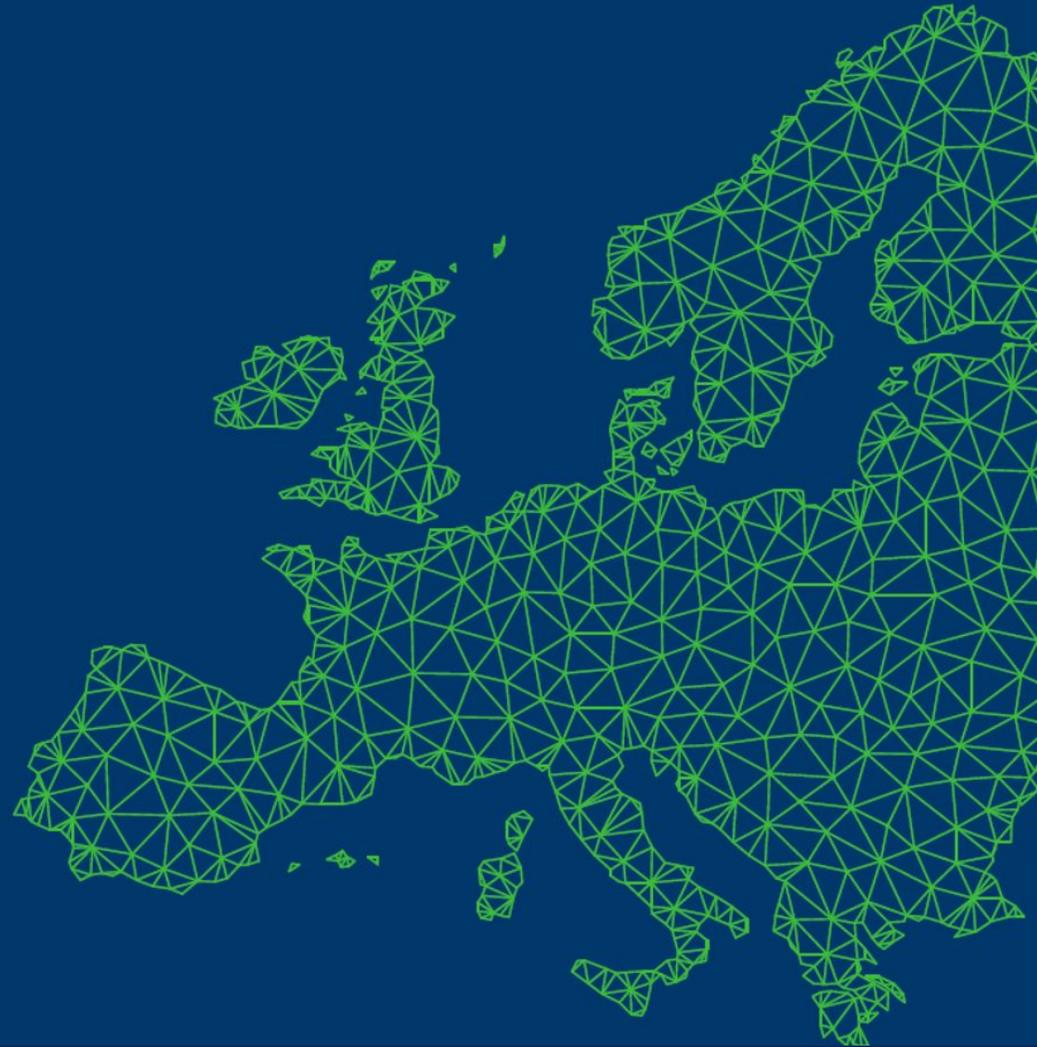
Norway: Regenerated energy 2007-2019



The new Flirt regenerates an average of 27% of the energy delivered



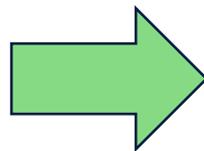
The framework



EU regulation and standards

- Energy metering system onboard train
- Provide the metering data to relevant settlement systems
- Register data of train movement and composition
- Run Traction Energy Settlement that includes metering data

What,
when,
how
who
is defined in



- ✓ EU Directives/Regulation
- ✓ ERA TSIs
- ✓ Cenelec EN50463
- ✓ UIC IRS 90930

Sector declaration (implementation agreement)

Railway Undertakings:

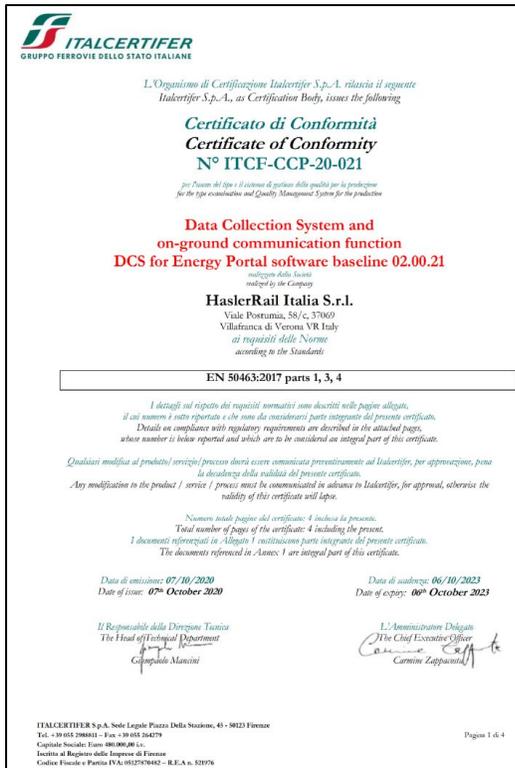
1. RU will install EMS on all traction units where this is technically and economically feasible. This should result in 60% equipped in 2025 and 90% in 2030.
2. All EMS on new traction units shall be fully compliant with LOC&PAS TSI:2018. Non-compliances on retrofitted EMS shall be stated.
3. All new and renewed EMS shall send data to DCS at least every 4 hours and before intentional powering down.
4. RU shall be able to deliver to the IM train compositions by 2023. This shall be done preferably at departure of train-run.

Infrastructure Managers:

1. IM shall provide DCS in accordance with ENE TSI:2018 latest in January 2022.
2. IM shall process data fast in DCS and exchange-function of Settlement and forward data without further delay in accordance with clause 5.4 of IRS 90930:2020.
3. International data exchanges will be in accordance with IRS 90930:2020.
4. IM enables a pragmatic approach to increase the possibilities of the RUs in the electricity purchasing strategy.
5. All relevant information is publically available.

Knowing and Trusting

DCS certified according to EN50463:2017 part 1,3 and 4 (the DCS-related parts)



Datacenter hosting the DCS is certified according to the following:

ISO 27001	Information technology - Security techniques - Information security management systems - Requirements
ISO 20000-1	IT service management
ISO 9001	Quality management systems - Requirements
ISO 14001	Environmental management systems
ANSI/TIA 942 - Rating 3	Concurrently Maintainable Site Infrastructure. Protection against most physical events.

DCS supplier is certified according to the following:

ISO 27001 (on-going)	Information technology - Security techniques - Information security management systems - Requirements
ISO/TS 22163	Railway applications - Quality management system - Business management system requirements for rail organizations
ISO 9001:2015	Quality management systems - Requirements
ISO 14001:2015	Environmental management systems
ISO 45001:2018	Occupational health and safety management systems - Requirements with guidance for use

High quality assurance of systems and suppliers